Annual Report

FOREST PEST CONDITIONS IN WISCONSIN

1965

WISCONSIN CONSERVATION DEPARTMENT

FOREST MANAGEMENT DIVISION

FOREST PESTS — SURVEY AND CONTROL

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A N N U A L R E P O R T

FOREST PEST CONDITIONS

IN

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INTRODUCTION

Cooperation and assistance by many individuals representing several agencies was appreciated and made it possible to probe into forest pest problems to a much greater extent than would have been possible otherwise. In addition to those from the Forest Management and other Department divisions, personnel from the following agencies participated in investigations on forest pest problems: University of Wisconsin, Wisconsin Department of Agriculture, U. S. Forest Service, several counties, and industry.

Highlights of some of the year's activity were the following:

FOREST INSECTS

. Pine tussock moth populations in Douglas County declined to the point where a control operation was cancelled.

. Maple webworm populations were light following light infestations by leafrollers in Northeast Area hardwood stands.

. A saddled prominent infestation on Chambers Island in Door County collapsed completely.

. Larch sawfly infestations were light in the Northwest Area where cocoons were extremely difficult to find. Similar conditions prevailed over most of the remainder of the state.

. Spring and fall cankerworm defoliation no longer apparent in the Montello vicinity in Marquette County.

. Acreage defoliated by walkingsticks in Marinette County was the smallest it has been in several years.

. Forest tent caterpillar egg mass surveys continued to be unproductive. Only two reports of observations of single caterpillars were received.

. Previously-heavy pine tortoise scale infestations in Douglas and Burnett Counties were reduced to those on scattered single trees. Conditions were similar in other areas.

. Bark beetle damage was generally less severe than in 1964.

. Jack-pine budworm larvae were numerous in parts of Northwest Area counties. Pupal and egg parasitism were low and egg counts were higher than in 1964. Populations were light in Marinette County and moderate in Adams and Wood Counties.

. The introduced pine sawfly was reported for the first time from Waushara County.

. Christmas tree problems in the Central areas were mostly on Scotch pine. Most troublesome pests were Hylobius weevils, pine spittlebug, scale insects. Late frosts and extended drought periods also affected the trees. Needle drop became apparent in September and left only the current year's needles on trees in many localities.

INSECT CONTROL

. Saratoga spittlebug was controlled with mistblowers and aircraft on 280 acres of plantations.

. White pine weevil control operations in the West Central and Northeast Areas were directed by pest control personnel. Experimental applications of 1% DDT, 1/2% lindane, and Allied Chemical compound GC 9160 provided excellent control. Diazinon was not effective at the rate used.

. A department Piper Pawnee was rigged for experimental applications of low-volume concentrate sprays. A department pilot received instruction in agricultural spraying techniques.

. Pine tussock moth eggs were collected for use in studies of pathogens of the insect to be conducted by a University of Pennsylvania pathologist in cooperation with Lake States Forest Experiment Station.

. Fat samples were collected from deer taken during the hunting season in Douglas County and elsewhere in the state. Analyses were made by the Wisconsin Department of Agriculture. Proportionately fewer samples from Douglas County contained residues and the residues were lower than in samples taken the previous year from the same area.

. A department pesticide use policy was initiated in October.

FOREST DISEASES

. Development of the Forest Disease Survey continued.

. Statewide sampling for Fomes annosus failed to reveal the presence of the disease. Samples from northeastern Minnesota were also negative.

. The long suspected presence of oak wilt in Dunn County was confirmed. Many new oak wilt infections were noted in the West Central Area.

. Walnut seedling mortality at Boscobel Nursery was investigated.

. Polyporus tomentosus, a root rotting fungus was found in the Crandall plantation in Sauk County.

. Maple dieback at various locations in Jefferson County appeared to be caused by a variety of factors ranging from drought to squirrel damage.

. Winter injury was severe on red pine in Rock County. Other conifers were less severely affected.

. A conference on needle blight of Austrian pine was held with Professor D. S. Richardson, Director of Forest Research, New Zealand Forest Service. The blight which is a Christmas tree problem in Wisconsin occurs on Pinus radiata in New Zealand and Kenya, Africa.

. The Wisconsin Forest Pest Survey and Control program was reviewed with Mr. Collin Bassett, a New Zealand forest pathologist.

. A bulletin on maple shade tree diseases and disorders was prepared in cooperation with the university.

. A forest pest leaflet on decays of maple was submitted for publication.

. Participated in conduct of the Oak Management Research Project in Green County.

Miscellaneous activities engaged in by pest control personnel included:

. Completion and acceptance of a written Memorandum of Understanding between the Conservation and Agriculture Departments.

. A cooperative evaluation of blister rust survey results on state lands by the Conservation and Agriculture Departments.

. Participation in the preparation of comprehensive management plans for several northern counties.

. A meeting with a representative of the Bureau of Sport Fisheries, U. S. Fish and Wildlife Service to discuss coordination of state and federal efforts in monitoring effects of pesticides on the landscape.

. Presentation of a talk on "Pesticide Residue Studies in Forested Area in Wisconsin" at a joint Western - Central International Forest Insect Work Conference in Denver, Colorado.

. Presentation of a paper on control of balsam gall midge at the North Central Branch Meeting of the Entomological Society of America at Louisville, Kentucky.

. Attendance at the annual meetinf of the Entomological Society of America.

. Attendance at a North Central Division Meeting of the American Phytopathological Society in Madison.

. Attendance at the national meeting of the American Phytopathological Society.

. Presentation of a letter on chemicals and pest control to a Vo-Ag group at Trees-for-Tomorrow Camp.

. Participation in lectures, training sessions, Christmas tree shearing demonstrations, and field trips with a variety of groups such as Boy Scout, Christmas Tree Growers Association, public and parochial school groups, college students, garden clubs, Lake Geneva Landscapers and Arborists Association, and Department personnel at various meetings.

. Preparation and maintenance of a State Fair exhibit in cooperation with Information and Education Division.

. Participation in the annual Central International Forest Insect and Disease Conference.

. Attendance at the Annual Pesticide Conference with Industry and the Second Annual Shade Tree Conference.

FOREST PEST SURVEY AND CONTROL
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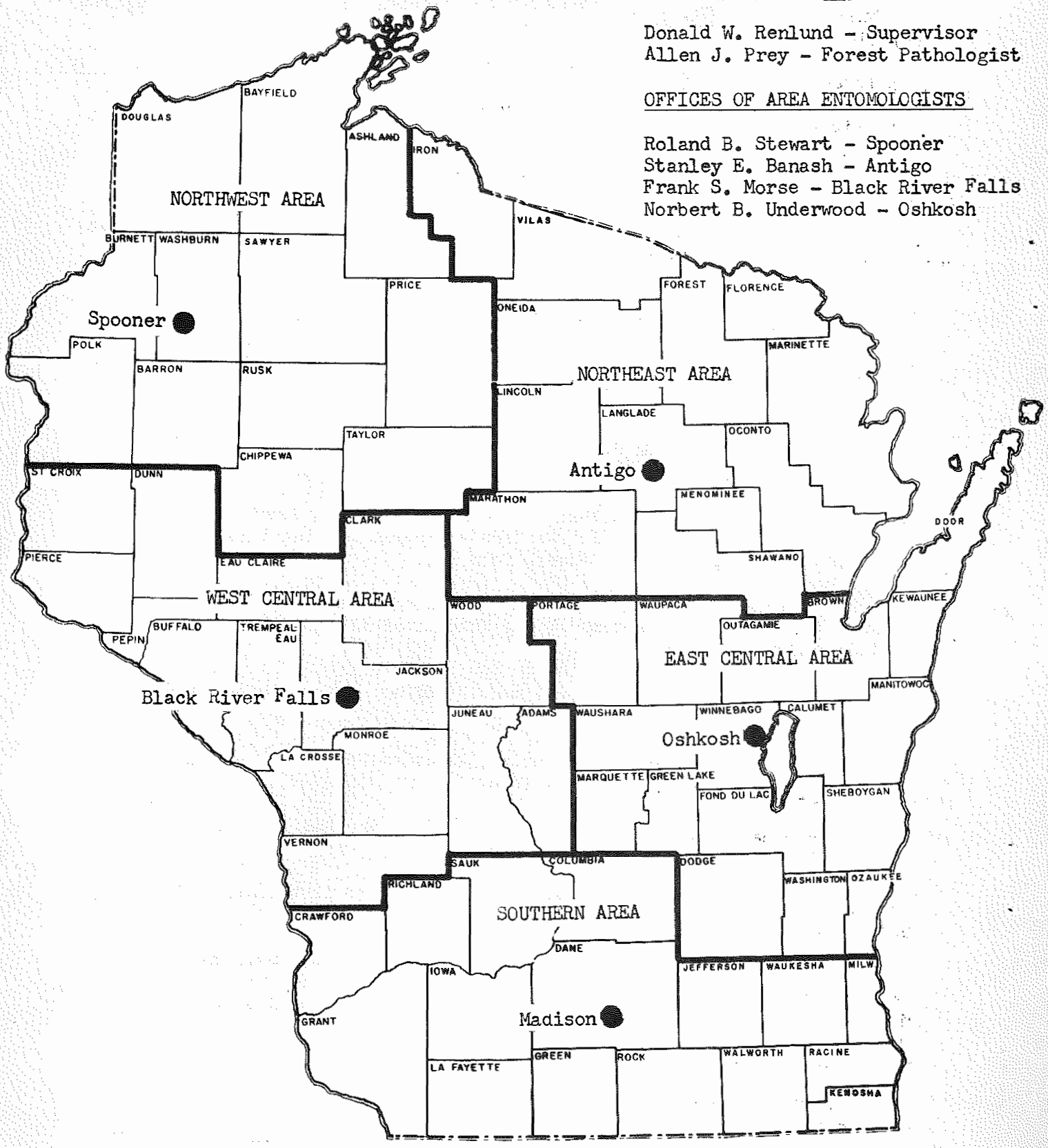


MAJOR FOREST INSECTS

COLEOPTERA

Strawberry Root Weevil - Brachyrhinus ovatus (Linnaeus)

Adult weevils were trapped the first three weeks of June in Waushara County plantations. The insects were reported entering homes in Black River Falls (Jackson County), Viroqua (Vernon County), and other West Central area communities from July 10 to 30, while in Waupaca and Winnebago Counties reports indicated they were entering dwellings throughout the month of July.

Although the insects were a nuisance in Spooner (Washburn County) and other Northwest area locations, they were far less numerous than they had been in 1964.

Bronze Birch Borer - Agrilus anxius Gory

This insect caused considerable branch and tree mortality of ornamental white birch in the vicinity of Spooner (Washburn County).

Calsoma Beetle - Calsoma calidum (Fabricius)

Adults were numerous and feeding on pine tussock moth larvae on June 15, in Section 29, T45N, R10W, Douglas County.

Cerambycids

Adequate moisture and an absence of sizeable fires in the Northwest counties contributed to a lack of any major activity by these insects in that part of the state. In Jackson County, however, Monochamus sp. were very active in jack pine killed by the 1964 hail storms. Paper mills stopped buying "dead" wood from this storm area about August 1, 1965.

Specimens tentatively identified as the black-horned juniper borer, Callidium janthinum Leconte, were received from Jackson County cut and seasoned eastern red cedar lumber.

Red Turpentine Beetle - Dendroctonus valens (Leconte)

A stand of mature red pine in Marathon County (Section 5, T27N, R8E) was attacked following thinning of an adjacent ten-year-old planting. The buildup of the beetles occurred after the thinned young trees had been piled near the older stand.

Oviposition was taking place on the large trees on May 31.

Pales Weevil - Hylobius pales (Herbst)

Pales weevils continued to be pests in West Central Area Scotch pine christmas tree plantations in which partial cutting had been done. Feeding injury by adults caused flagging in many plantations, especially in Adams and Wood Counties. A "moderate" emergence of adults occurred in many of these plantations during September. Fall feeding on twigs and buds by these adults was less than it had been in 1964, apparently because of cool, wet, fall weather and a declining population.

Christmas tree growers with pales weevil problems were advised to treat tree stumps and the root collars of remaining trees with BHC. This prevented establishment of larvae on stumps, and destroyed new adults on emergence through treated soil and on contact with insecticide beneath trees on which they fed initially.

The weevil was one of three species trapped in abundance in Burgess Tree Farm (Section 19, T18N, R9E) and G. R. Kirk Co. (Section 26, T18N, R9E) Christmas tree plantations in Waushara County. Traps consisting of freshly-cut pine discs were checked in the Burgess plantation between June 4 and 15, and in the G. R. Kirk Co. plantation between June 15 and 26. Flagging of Scotch pine in these plantations was severe and much of it appeared too early to be termed current. Most of the flagging was attributed to Pales weevil, but this has not been confirmed, and it is assumed that much of the feeding occurred late the previous year and more in the spring of 1965. Many stumps of trees cut in 1964 had large numbers of weevil larvae which were tentatively identified as H. pales. Screened traps placed over infested stumps were unproductive and subsequent examination of the stumps showed that for unknown reasons the insects did not complete their cycle. The same phenomenon was observed in unscreened stumps.

Tree mortality in a young Scotch pine planting in Oneida County (Section 28, T36N, R7E) was approximately 10% following attacks on trees which ranged between three and five feet in height. Larvae and pre-pupae were observed at this location on July 6.

Root Collar Weevil - Hylobius radicis Buchanan

Northwest Area - Very little tree mortality or windthrow was noted in areas of known infestations during 1965. The only new infestations reported were in Scotch pine Christmas tree plantings in Burnett County, Section 26, T39N, R19W, and Section 34, T41N, R11W in Washburn County.

Northeast Area - Tree mortality was observed in pole-size Scotch pine in the Star Lake plantation in Vilas County. Bark beetle attacks were associated with the weevil infestation. Additional root collar weevil attacks were reported in Scotch pine Christmas tree plantings in Shawano County.

West Central Area - Tree mortality was reported only in Christmas tree operations - primarily of Scotch pine. Weevil injury was frequently found associated with pales weevil and pine root weevil damage.

East Central Area - Damage was most prevalent in Scotch pine plantings. Some of the older red pine shelterbelts on depleted soils are tipping and exhibit symptomatic damage of root collar weevil and root weevil.

Southern Area - Damage characteristic of that caused by the weevil occurs infrequently in Scotch and red pine windbreaks and plantations in the western and northern counties of the area.

Pine Root Weevil - Hylobius rhizophagus Millers

This insect has great potential as a destructive agent in our pine plantations unless an effective means of combating it is found according to reports from the two central areas. The weevil occurs in the Northwest Area but has not been reported from the Northeast.

Northwest Area - Two new infestations were reported and confirmed in the area. One was in a Washburn County plantation in Sections 11 and 12, T40N, R13W, and the other in Burnett County in Section 15, T40N, R17W. Investigation revealed that tree mortality started at least two years ago. New tree mortality was noted in known infestations in Burnett and Washburn Counties.

West Central Area - The pine root weevil is the major forest insect pest in the area. Trees in infested plantations continue to die and pockets of infestation continue to spread until whole plantations are destroyed. The Black River State Forest clear-cut to salvage about 35 acres of 25-year-old jack pine plantation which were heavily infested. Less than two cords per acre were salvaged for a return of about $6.00 per acre.

Attempts at silvicultural control by thinning have not stopped infestations and forest managers are not willing to invest in a noncommercial thinning at 12 to 15 years to attempt to reduce the hazard.

In limited chemical control tests, heptachlor at one pound per acre and chlordane at three pounds per acre (active ingredient in each instance), applied as 10% granules have definitely reduced infestations. Test plots were continued and enlarged in 1965. Costs are prohibitive for commercial application.

East Central Area - The pine root weevil is present in many places and appears to be the most potentially dangerous insect of hard pines in the area. Removal of infested and border trees has not stopped the Lawrence Creek infestation in Marquette County.

Pine Bark Beetles - Ips sp.

Northwest Area - Apparently soil moisture was adequate so that trees were able to resist beetle attacks. In contrast to the population build-up in 1964, only a few scattered trees were killed this year.

Northeast Area - The number of outbreaks were greatly reduced compared to 1964. Drought conditions were alleviated by persistent rains, and damage to young red pine plantings ceased to be a problem.

Some individual tree mortality was reported from NENE Section 10, T27N, R20E (Oconto County), and Section 19, T32N, R19E (Marinette County).

West Central Area - During May, overwintering bark beetles were active near 1964 infestations. Populations declined during the summer. Attacks found later in the season were frequently associated with Armillaria mellea root rot which appeared to have entered drought damaged root systems. Little additional damage occurred in shelterbelts in Buffalo, Dunn, and Trempealeau Counties that were damaged in 1964.

A Jackson County Forest crew was directed in chemical treatment of hail and drought weakened jack pine in the Hatfield park for bark beetle control.

East Central Area - Bark beetles were found in scattered trees which had been predisposed to attack by adverse conditions. Attacks were observed on single trees and groups of up to 15 trees. Some of the infested trees were under attack by root collar weevil, pine root weevil, or a root rot. Most of them had suffered from drought. Tree mortality in the area was low.

White grubs - Phyllophaga sp.

Northwest Area - Little damage was reported to plantations in the area. However, heavy flights of beetles were observed in and around Trego and Spooner (Washburn County) during the first two weeks of June. Heavy flights occurred in the vicinity of Barron (Barron County) about the same time. Feeding by the beetles resulted in severe defoliation of aspen and oak in some localities in these counties.

Northeast Area - Severe defoliation of aspen and oak occurred in scattered locations in Langlade County especially in Section 17, T31N, R13E, and Section 22, T30N, R12E; and in Section 11, T43N, R8E in Vilas County. At observation points in Langlade County the sound of flying beetles was audible for several hundred feet when evening flights were heaviest.

West Central Area - No grub damage to new plantings was reported. Moderate beetle flights were reported from Monroe County.

East Central Area - Little preventive treatment was done and no significant damage to new plantings was reported. Heavy nocturnal feeding on mountain ash by Phyllophaga drakii (Kirby) and turf damage were reported in the Oshkosh area (Winnebago County). Evidence of predation by skunks, raccoons, and crows was noted in sod fields which had high grub populations.

Southern Area - Damage to recent red pine plantings in sod fields in Richland County township was severe but localized. Numerous spots disturbed by predators in search of grubs were apparent in fields throughout the township visited on October 28. An adult specimen of Phyllophaga tristis Fabricius was found 14 inches below the surface in sandy loam on a hillside with a southwest exposure.

Phenological Note:

June 10 - Flights reached apparent peak in Langlade County.

White-Pine Weevil - Pissodes strobi (Peck)

Northwest Area - Only an occasional infested tree was observed as weevil populations remained low.

Northeast Area - A single heavily infested white pine planting was noted in Section 36, T30N, R18E, Oconto County, but generally populations remained low. Light infestations were reported on Scotch pine in Langlade and Shawano Counties.

West Central Area - Populations were apparently about the same as in 1964, judging by numbers of infested leaders, which ranged from very low in southern counties of the area up to 30 per cent of the current leaders in some Clark and Jackson County plantations.

Insecticide evaluation plots for white-pine weevil control were established in plantations in Clark and Jackson Counties. Insecticides tested were Allied Chemical's GC - 9160, a chlorinated hydrocarbon, and Diazinon, a broad spectrum organo-phosphate from Geigy Chemical Company. Lindane (0.5%) and DDT (1.0%) were used as standards. Compound GC - 9160 gave excellent control of the white-pine weevil but Diazinon was unsatisfactory.

Application of 1% DDT sprays to white pine leaders in a 36 acre Clark County Forest plantation was supervised by the Area Entomologist.

East Central Area - Less than 1% of the white pine leaders in a plantation at the Wild Rose Fish Hatchery (Waushara County) were infested following several years of pruning out infested leaders in an attempt to reduce the population. The reduction was better than anticipated and the plantation is now on a maintenance schedule. Paucity of attacks in 1965 were attributed to low residual populations from 1964, and in one plantation to a mechanical control program.

Southern Area - Weeviled trees were scarce even at the northern fringes of the area.

Phenological Notes:

May 20 - Feeding punctures were evident on Norway spruce in Langlade County.

June 24- Pre-pupae were observed in terminals, but no adult emergence holes, in Langlade County Norway spruce.

Hickory Bark Beetle - Scolytus quadrispinosus Say

The beetles were active and more hickory mortality was reported from the NWA at Balsam Lake and vicinity (Polk County) where mortality of hickory trees had been reported in 1964. Loss of scattered trees in mixed stands in Dunn and Pierce Counties in the West Central Area was also reported.

DIPTERA

Balsam Gall Midge - Cecidomyia balsamicola (Lintner)

A single heavy midge infestation was observed on a Washburn County Christmas tree planting in the Northwest Area, in Section 34, T41N, R19W, but the insect was more of a problem to growers in the Northeast Area.

A few balsam fir plantings in Langlade, Lincoln, and Oconto Counties were again heavily infested, but populations in other Northeast Area counties dropped appreciably from the highs of 1963 and 1964. Many of the growers resorted to chemicals in an attempt to control the pest. Heavy frost damage in mid-June killed many of the heavily infested twigs, particularly on the lower sites.

Fraser fir growing adjacent to balsam fir in one plantation has been escaping attack by the gall midge, and the question arose as to its susceptibility. Inspection of a nursery in Langlade County, a short distance from the plantation, revealed a single infested Fraser fir twig with only a half dozen infested needles on it. The tree was the only one of approximately two hundred three to four foot tall Fraser firs in the nursery that was found to be infested.

Phenological Notes:

May 12-Balsam fir candles were 3/4" to 1-1/4" long in Langlade County.

May 24-First adult midges of the season appeared in traps.

May 28-Fraser fir buds were just beginning to swell.

Red Pine Needle Midge - Thecodiplosis piniresinosae Kearby

The midge was collected and identified from a few damaged needle clusters observed at only one location in Jackson County.

Pitch Midge on Jack Pine -

Very little twig mortality was noted in the Northwest Area where populations of this midge were much lower than in 1964. At several locations in central Adams County in the West Central Area, large numbers of eggs were observed on new candles on May 20.

HEMIPTERA

Pine Spittlebug - Aphrophora parallela (Say)

Northwest Area - Spittle masses were frequently observed throughout the area. The most severe infestations were in Sections 8, 9, 16, and 17, T36N, R20W in Polk County; and Sections 7, 8, 17, and 18 T39N, R17W in Burnett County. Within some jack pine stands in the sections listed, the entire upper halves of tree trunks were covered with foamy spittle. No tree mortality, attributable to the insect, was noted, even in stands where heavy infestations had persisted for two years.

Adult spittlebugs were first noted in Burnett County on June 22.

Northeast Area - Moderate to heavy infestations were found in young jack pine plantings in Marinette County, but were light elsewhere in the area.

West Central Area - While spittle masses were less numerous than in 1964, they were common in Adams, Eau Claire, Juneau, Jackson, and Monroe Counties.

East Central Area - Flags appeared early in the year on Scotch, white, and jack pine, but the insects were not as plentiful as in 1964.

Southern Area - Spittle masses were infrequently observed.

Saratoga Spittlebug - Aphrophora saratogensis (Fitch)

A slight increase in nymphal counts was noted in Northwest Area plantations, but no damage from adult feeding was apparent. Populations were also low in the West and East Central Areas, where the only damage reported involved a few red pine in a single Waupaca County plantation.

Increased populations were noted in several localities in the Northeast Area. Highest counts were made in red pine plantings in Marinette, Oneida, Shawano, and Vilas Counties, particularly in those which had a past history of spittlebug damage. Susceptible plantings, mostly of small acreage, are still numerous, and a few required chemical treatment. These were treated with 5% DDT to which one ounce of Plyac had been added per gallon of spray. A back-pack mistblower was used to apply the spray mixture to a total of 188 acres on the following descriptions:

County	Ownership	Legal Description	Acreage Treated
Vilas	State	NESE Sec. 8, T41N, R7E	18
		NENW Sec. 4-33, T42N, R7E	23
		NWNW Sec. 12, T41N, R7E	8
		NENE Sec. 19, T42N, R7E	15
		NWSE Sec. 3, T42N, R7E	3
Oneida	Private	Sec. 32, T39N, R5E	42
Marinette	State	NESW NWSE Sec. 11, T35N, R18E	12
		SESW NWSE SWSE Sec. 13, T37N, R19E	8
		SENW NESW Sec. 8, T37N, R20E	20
		NESE NWSE SWSE Sec. 32, T37N, R18E	24
Shawano	Private	Sec. 35, T26N, R15E	15
		Total	188 Acres

An experimental low volume application of undiluted 25% DDT emulsifiable concentrate, to which 2 ounces of aroclor 5460 (an extender) had been added per gallon, was made on three plantations totalling 92 acres. The chemical was applied at the rate of one-half pound in one quart per acre to the following private plantings in Menominee County:

Description	Acreage Treated
NW 1/4 Sec. 14, T28N, R15E	17
S1/2 NW 1/4, Sec. 27, T28N, R15E	34
SWNE NWSE Sec. 26, T30N, R15E	4
Total	92 Acres

The mistblower application and the low volume concentrate treatment each resulted in excellent control.

Phenological Notes:

May 27 - No evidence of egg hatch in the Town of Stephenson, Marinette County.

June 8 - 80% of nymphs in second instar in Shawano County.

Pine Needle Scale - Phenacaspis pinifoliae (Fitch)

A buildup of this insect was apparent along the Mississippi River Valley during 1965. They were noted in a school forest plantation near Trempealeau (Trempealeau County) and on white pine Christmas trees near Pepin (Pepin County), they were also reported on Scotch pine Christmas trees near Hixton (Jackson County), and on ornamentals in Adams, Dane, and Monroe Counties. White pine reproduction in Waushara County was infested. Chemical control was recommended on a few heavily infested ornamental white pine and spruce in Dane County.

Pine Bark Aphid - Pineus strobi (Hartig)

Until 1961 alternate treatment of white pine nursery stock with nicotine sulfage and malathion at seven to ten day intervals had not been providing satisfactory control of the pine bark aphid. As many as 5 to 7 treatments were applied during a growing season.

In 1961 trials were conducted with lindane at approximately 1/2% concentration to which one ounce of aroclor had been added for each gallon of finished spray. The mixture was applied on 2-0 beds at a rate of 0.171 gallons per 4' x 12' bed, or 155 gallons per acre. The concentration was reduced to 1/4% and applied to 1-0 beds at the same rate. One early summer application was very successful in keeping the insects under control.

Current practice has been to apply 100 to 150 gallons per acre of spray mixture containing 0.032 pounds of active ingredient per gallon in a single annual application in late May. This has resulted in application of 3.2 pounds to 4.8 pounds of the chemical per acre. The minimum effective rate of application is being sought.

Pine Tortoise Scale - Toumeyella numismaticum (Pettit & McDaniel)

Scattered single trees or small groups of trees were infested in the Northwest, Northeast, and West Central areas. Heavily infested jack pine trees were reported in Sections 2 and 10, T36N, R18E in Marinette County, Section 36, T32N, R15E in Oconto County, and on jack and Scotch pine in Langlade, Oneida, and Vilas Counties. Similar conditions were noted in Jackson County Scotch pine Christmas tree plantations, and occasional infested jack pines were observed in Jackson and Clark Counties.

HYMENOPTERA

Introduced Pine Sawfly - Diprion similis (Hartig)

A few individual trees were noticeably defoliated in the Northwest Area where larvae of the fall generation were more abundant than those in the spring.

In the vicinity of Eagle River (Vilas County) perceptible defoliation occurred mostly in mature natural stands of white pine. Mature larvae and cocoons were abundant in Vilas County on August 28.

Elsewhere in the state little observable defoliation was encountered. The presence of larvae on white pine was recorded in Waushara County, near Wild Rose, for the first time.

Red-Headed Pine Sawfly - Neodiprion lecontei (Fitch)

A few scattered colonies were noted in Burnett, Douglas, and Washburn Counties in the Northwest Area, in Langlade and other Northeast Area Counties, and in some West Central Area Counties. Although two red pine plantations in Section 7, T32N, R14E (Langlade County) had only light infestations, the owners applied chemicals with back-pack sprayers to control the insect.

Phenological Notes:

July 16 - Larvae mostly second instar in Langlade County.

August 26 - Larvae mature in Langlade County.

Red Pine Sawfly - Neodiprion nanulus nanulus Schedl

Populations remained low everywhere in the state.

Two colonies were found on ornamental red pine in Shell Lake (Washburn County, Northwest Area) on June 13, and a few colonies were reported from a single location in Waushara County in the East Central Area.

White Pine Sawfly - Neodiprion pinetum (Norton)

Reports of activity of this sawfly indicated larvae were scarce in the West Central and Southern Areas. No reports were received from other areas. First generation larvae in the 4th and 5th instars were found on white pine at Sparta (Monroe County, West Central Area) on July 13.

Jack Pine Sawfly - Neodiprion pratti banksianae Rohwer

Numerous scattered colonies were encountered in parts of Douglas County (Northwest Area) but defoliation was negligible.

Moderate defoliation occurred in a small area of young jack pine in Section 8, T32N, R15E (Oconto County, Northeast Area).

- Neodiprion virginianus complex

Light residual populations remain in plantations near Trempealeau (Trempealeau County, West Central Area) and little defoliation was apparent. A Tachinid parasite emerged from larvae collected on October 29.

Larch Sawfly - Pristiphora erichsonii (Hartig)

Defoliation was difficult to discern anywhere in the Northwest Area where little oviposition injury was noted, only a few larvae were found, and cocoons were scarce.

Populations were dropping in West Central Area stands where defoliation was light to moderate in most of them. An estimated 25% to 50% of the available foliage was consumed on survey plots examined.

LEPIDOPTERA

Cankerworms - Fall Cankerworm - Alsophila pometaria (Harris)
Spring Cankerworm - Paleacrita vernata (Peck)

An infestation which had persisted in the Montello vicinity (Marquette County) for the past few years, apparently has Defoliation in parts of Dane and Columbia Counties ranged from to moderate on scattered sites. Defoliation was generally very light in the West Central Area where a few elms were defoliated.

Maple Blight Associates - Leaf Rollers:
Acleris chalybeana (Fernald)
Sparganothis acerivorana (McKay)

Maple Webworm:
Tetralopha asperatella (Clem.)

Surveys were conducted periodically in all areas of Florence, Forest, Langlade, and Menominee Counties where defoliation has been severe in recent years. Populations of Sparganothis acerivorana (McKay) were light in the counties mentioned. Populations of Acleris chalybeana (Fernald), which provides oviposition sites for the maple webworm, were moderate in Menominee County and light elsewhere.

Eggs of the maple webworm, Tetralopha asperatella (Clem.), had been sparsely laid in about 20% of the available oviposition sites by mid-August. Defoliation in mid-September was very light.

Phenological Notes:

May 18 - Larvae of S. acerivorana were in the 1st and 2nd instars

June 1 - Larvae of S. acerivorana were in the 3rd and 4th instars

June 18 - Larvae of A. chalybeana were in the 1st and 2nd instars.

August 12 - Larvae of T. asperatella were in the 1st and 2nd instars.

Large Aspen Tortrix - Archips conflictana (Walker)

Scattered aspen stands were partially defoliated in Ashland, Price, Rusk, and Taylor Counties in the Northwest Area, and Clark and Wood Counties in the West Central Area. Defoliation was generally less apparent in stands in these areas than in 1964.

Larvae were observed in nearly every stand visited in Lincoln, Oneida, and Vilas Counties in the Northeast Area. The most severe defoliation was noted in and around Section 16, T34N, R5E in Lincoln County on single trees and in small patches of timber.

Jack-Pine Budworm - Choristoneura pinus (Freeman)

The budworm was numerous in parts of Polk, Burnett, Douglas, and Bayfield Counties in the Northwest Area. (See maps, pages 17 & 18). Defoliation was most severe in T39N, R17W, and T40N, R17W in Burnett County. Timber sales were set up to provide for removal of older age groups by cutting entire stands or clumps of jack pine in an effort to diminish sources of budworm buildup. Pupal and egg counts completed during the summer indicated relatively high populations may be expected again in 1966, but no chemical control is planned at this time. However, experimental chemical control will be attempted in the spring of 1966 in the continuing search for effective, but less persistent insecticides than DDT.

Sample plots in Marinette and Oneida Counties in the Northeast Area indicated little budworm activity in stands where the insect has caused no problems for the past several years.

In the West Central Area early instar surveys, which involved checking larvae in new shoots and staminate flowers, indicated populations were light in Adams and Wood County plots. Late instar populations were very light, and a few larvae were found in a small area in Adams County. Egg masses were scarce and no apparent defoliation was observed later in the summer.

Phenological Notes:

May 13 - First active larvae observed in Polk County.

May 20 - Extremely heavy staminate flower production in Marinette County.

June 24 - Larvae were in the 4th and 5th instars in Bayfield County.

June 25 - Pupation was starting in Polk County.

July 6 - Moths were observed in Polk County.

Pine Tussock Moth- Dasychira plagiata (Walker)

Pine tussock moth larval populations had remained sufficiently high in Douglas County in the fall of 1964, on 12,000 acres of timber to the southwest of an area treated in the spring of the same year, to warrant consideration of another chemical control operation in the spring of 1965.

Spring arrived late in 1965. Live larvae became increasingly difficult to find by March. When they had emerged from hibernation in mid-May, high populations could be found in only a few small scattered locations. It was observed that overwintering survival was better on red pine than on jack pine, and rather severe defoliation developed on planted red pine in parts of Section 29, T45N, R10W by mid-June.

By June 3, sufficient evidence of the population collapse had been observed to cancel plans for an operational chemical control program and an application for federal aid. Attention was then centered on testing new chemicals on suitable remaining pockets of infestation.

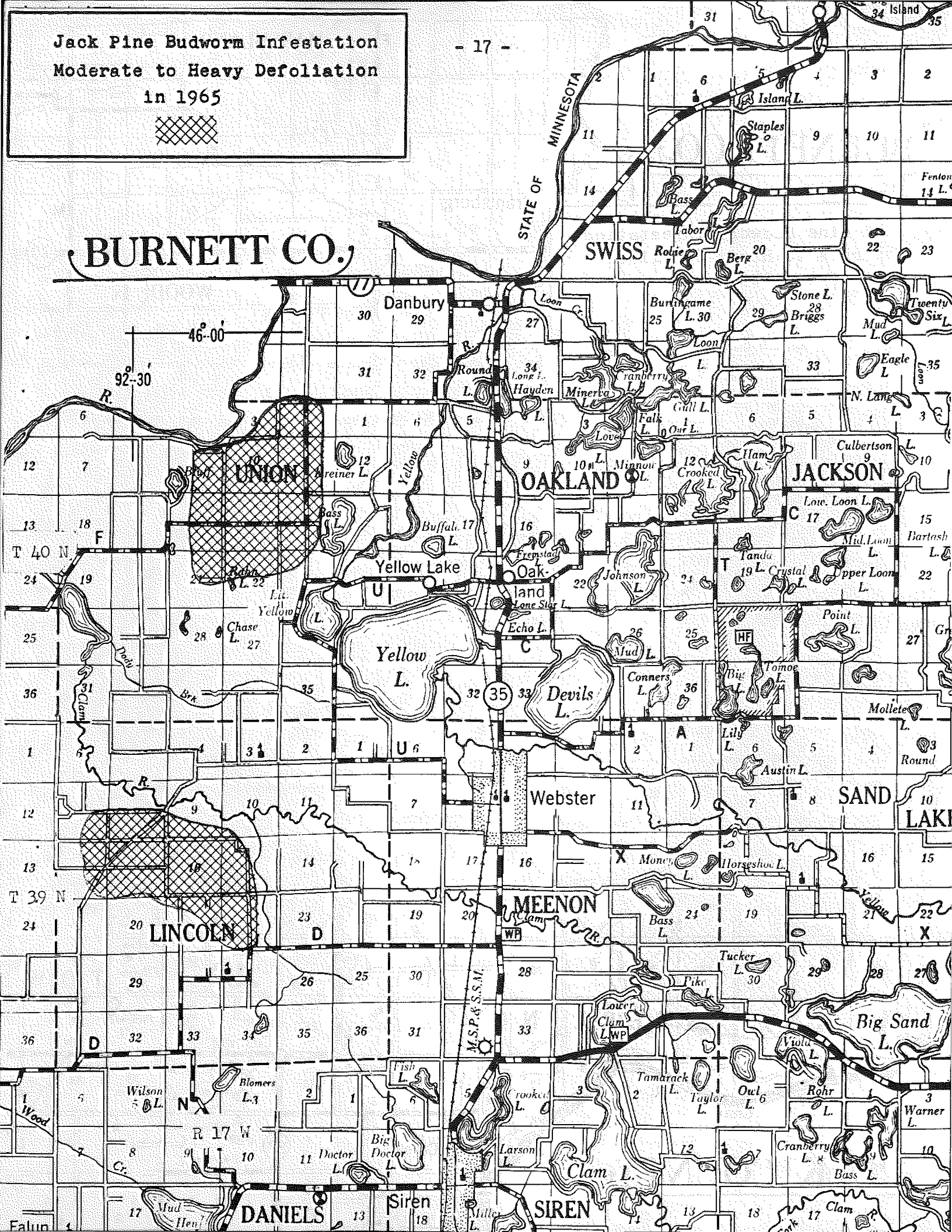
A Piper Pawnee agricultural airplane, 1960 model, was made available to the Pest Control Section by the Forest Protection Division early in 1965. The airplane was rigged for low volume application of concentrated pesticides by Aerial Blight Control, Inc., of West Bend, Wisconsin.

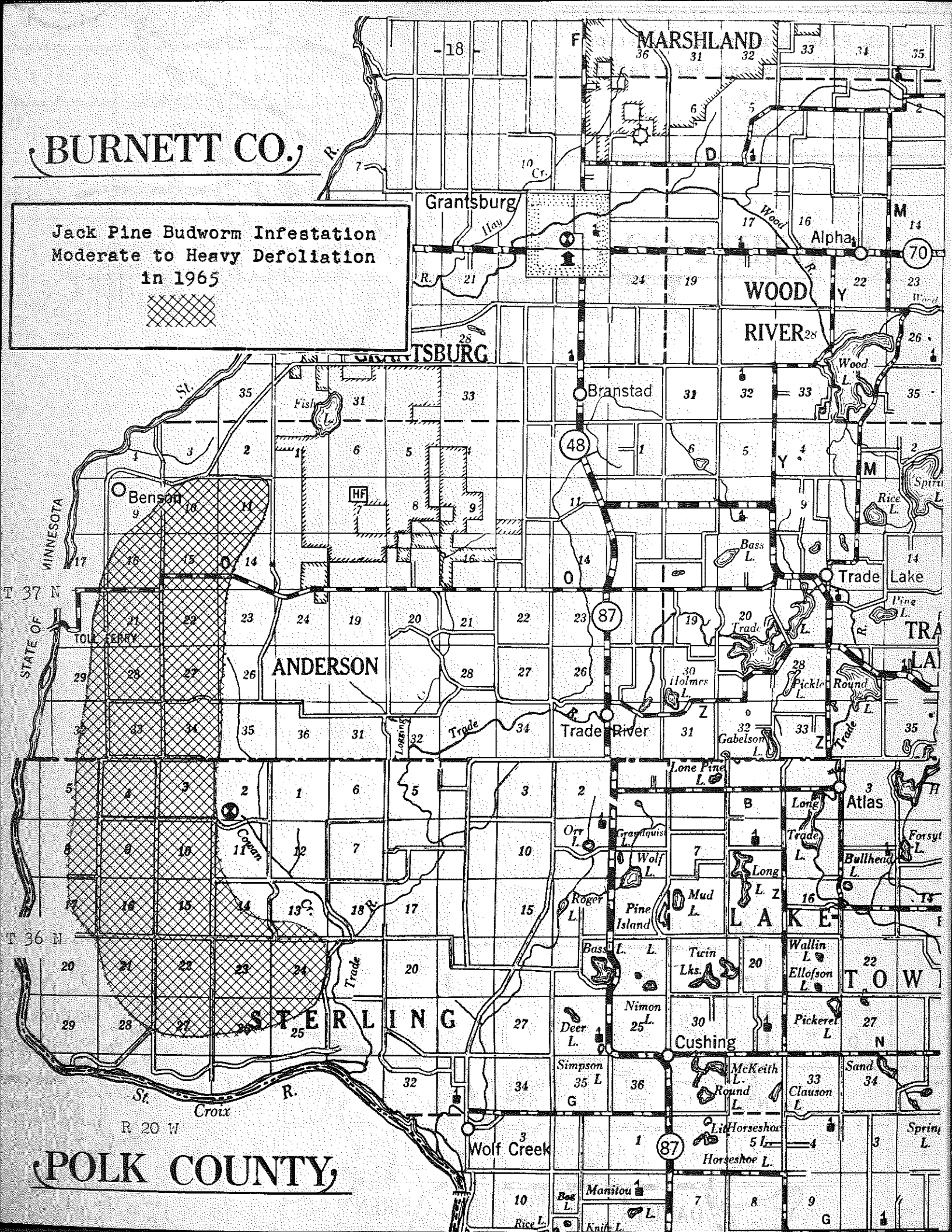
A cooperative test of two promising nonpersistent chemicals for tussock moth control was arranged with university entomologists.

Dibrom 14, a bromine, chlorine-containing organic phosphate, and an experimental compound, Shell 8447, were each tested at two rates of application. Two twenty-acre replications were used for each treatment. Two similar untreated twenty-acre blocks were used as checks.

Dibrom 14 was applied at rates of 4 ounces actual in 8 ounces of spray, and 8 ounces actual in 8 ounces of spray material. The Shell experiment compound was applied at the rate of 32 fluid ounces per acre.

Ten branches were tagged with plastic tape on each of twenty plots on each replicate and on each check area. Larvae were counted on the tagged branches just prior to treatment and at intervals of 24 and 72 hours after treatment.


Jack Pine Budworm Infestation
Moderate to Heavy Defoliation
in 1965
BURNETT CO.
STATE OF MINNESOTA
SWISS
Danbury
UNION
OAKLAND
JACKSON
Yellow Lake
Webster
MEENON
LINCOLN
SAND LAKE
DANIELS
SIREN
Siren
Falun
T 40 N
T 39 N
R 17 W
46°-00'
92°-30'
Yellow L.
Devils L.
Big Sand L.
Clam L.
Island L.
Staples L.
Fenton L.
Bass L.
Tabor L.
Robie L.
Berg L.
Stone L.
Twenty Six L.
Burningame L. 30
Briggs L.
Mud L.
Loon
Eagle L
N. Lang L.
Round L.
Long L.
Hayden L.
Minerva L.
Cranberry L.
Gull L.
Falk L.
Our L.
Love
Culbertson L.
Ham L.
Minnow L.
Crooked L.
Low. Loon L.
Mid. Loon L.
Upper Loon L.
Tanda L.
Crystal L.
Johnson L.
Oakland
Lone Star L.
Echo L.
Point L.
Mud L.
Conners L.
Big L.
Tomoe L.
Mollette L.
Lily L.
Austin L.
Round
Money L.
Horseshoe L.
Bass L.
Tucker L. 30
Pike L.
Lower Clam L.
Viola L.
Tamarack L.
Taylor L.
Owl L.
Rohr L.
Warner L.
Cranberry L.
Bass L.
Larson L.
Fish L.
Wilson L.
Blomers L.3
Big Doctor L.
Doctor L.
Crooked L.
Mud Hen
Mill L.
Clam
Wood Cr.
Yellow R.
Clam R.
M.S.P.&S.S.M.
Loon Cr.
Dark Brk
Lit Yellow
Chase L.
Bass L.
Buffalo L.
Frenstad
Rahn L.
Reiner L.
Bog
Island
Fenton
Eagle
Point
Big
Tomoe
Culbertson
Ham
Low. Loon L.
Mid. Loon L.
Upper Loon L.
Tanda
Crystal
Johnson
Oakland
Lone Star L.
Echo L.
Conners L.
Mollette L.
Lily L.
Austin L.
Round
Money L.
Horseshoe L.
Tucker L. 30
Pike L.
Lower Clam L.
Viola L.
Tamarack L.
Taylor L.
Owl L.
Rohr L.
Warner L.
Cranberry L.
Bass L.
Larson L.
Fish L.
Wilson L.
Blomers L.3
Big Doctor L.
Doctor L.
Crooked L.
Mud Hen
Mill L.
Clam
Wood Cr.
Yellow R.
Clam R.
M.S.P.&S.S.M.
Loon Cr.
Dark Brk
Lit Yellow
Chase L.
Bass L.
Buffalo L.
Frenstad
Rahn L.
Reiner L.
Bog


BURNETT CO.
Jack Pine Budworm Infestation
Moderate to Heavy Defoliation
in 1965
MARSHLAND
Grantsburg
Alpha
WOOD
RIVER
Branstad
Benson
Trade Lake
ANDERSON
Trade River
Atlas
LAKE
STERLING
Cushing
Wolf Creek
POLK COUNTY
STATE OF MINNESOTA
TOLL FERRY
St. Croix R.
T 37 N
T 36 N
R 20 W
70
48
87
Wood R.
Hay Cr.
Trade
Logging
Coppan
Fish L.
Bass L.
Rice L.
Holmes L.
Gabelson L.
Lone Pine L.
Orr L.
Grandquist L.
Wolf L.
Roger L.
Pine Island
Mud L.
Long L.
Twin Lks.
Deer L.
Nimon L.
Simpson L.
McKeith L.
Round L.
Clauson L.
Wallin L.
Ellofson L.
Pickerel L
Sand
Manitou
Horseshoe L.
Bog L.
Rice L.
Knife L.

Results of the tests have not been published, but apparent control was poor. Unavoidable delays in equipping the airplane forced postponement of the tests until June 30 and July 1. By this time most of the tussock moth larvae were in the last instar and many were already pupating, so the results were not necessarily indicative of the capabilities of the chemicals for controlling the insect.

The airplane and the spray system functioned well with a veteran forester-pilot, turned neophyte spray pilot, at the controls.

Larval and pupal parasitism were low in the area in 1965 and high egg counts resulted over approximately 8,000 acres of timber. Egg counts ranged up to 2,940 for ten minute counts, with 800 considered as indicative of a high population. Eighteen plots had counts above 800. Examination of the acreage on October 12, 1965 revealed that browning of tree tops had occurred in scattered localized spots, and was not severe (See map, page 20). A decision was made to plan only for continued testing, in the spring of 1966, of chemicals which might be suitable, but less persistent, substitutes for DDT.

Pine tussock moth eggs were collected in cooperation with entomologists from the Lake States Forest Experiment Station for use in studies of pathogens of the insect.

Phenological Notes: (Douglas County)

May 4 - Larvae starting to break hibernation.

May 5 - First larval feeding noted.

May 14 - First Meteorus cocoons of the season noted in the Gordon area.

May 19 - First Meteorus cocoons noted in Section 29, T45N, R10W.

June 1 - Larvae mostly in the 3rd and 4th instars.

June 15 - Calosoma calidum (Fabricius) adults numerous, feeding on tussock moth larvae in Section 29, T45N, R10W.

June 28 - First pupae noted.

July 13 - Most larvae (95%) pupated.

July 21 - First eggs of the season observed.

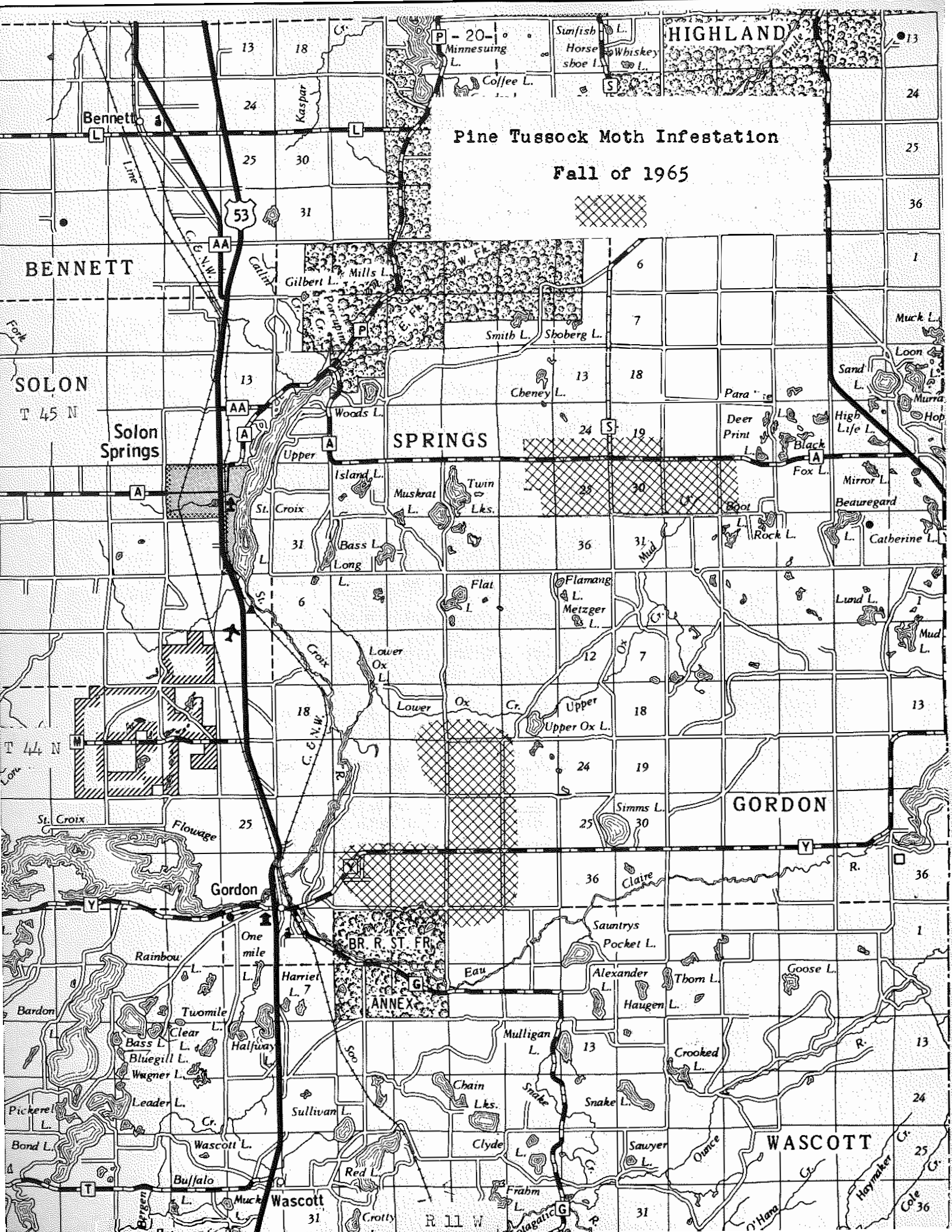
July 29 - Major oviposition completed.

August 4 - First hatched eggs of the season observed.

August 17 - Approximately 40% of egg masses hatched.

August 23 - Approximately 80% of egg masses hatched. Some larvae already hibernating.

September 2 - About 99% of larvae hibernating.


Pine Tussock Moth Infestation
Fall of 1965
BENNETT
SOLON SPRINGS
HIGHLAND
GORDON
WASCOTT
T 45 N
T 44 N
R 11 W
Bennett
Solon Springs
Gordon
Wascott
ANNEX
Minnesuing L.
Coffee L.
Sunfish L.
Horseshoe L.
Whiskey L.
Kaspar
Line
Gilbert L.
Mills L.
Porcupine Cr.
Smith L.
Shoberg L.
Cheney L.
Woods L.
Upper St. Croix
Island L.
Muskrat L.
Twin Lks.
Bass L.
Long L.
Flat L.
Flamang L.
Metzger L.
Lower Ox L.
Lower Ox Cr.
Upper Ox L.
Ox Cr.
Simms L.
Flowage
Claire R.
Rainbou L.
One mile L.
Harriet L.
Tuomile L.
Clear L.
Halfway L.
Bardon L.
Bass L.
Bluegill L.
Wagner L.
Leader L.
Pickerel L.
Bond L.
Wascott L.
Buffalo L.
Muck L.
Bergen
Crotty
Frahm L.
Red L.
Clyde L.
Sullivan L.
Chain Lks.
Soo
Snake
Snake L.
Mulligan L.
Crooked L.
Sauntrys Pocket L.
Alexander L.
Haugen L.
Thorn L.
Goose L.
Eau
Sawyer L.
Ounce
Haymaker
Cole
O'Hara
Deer Print L.
Black
Fox L.
High Life L.
Sand L.
Muck L.
Loon
Mirror L.
Beauregard L.
Catherine L.
Rock L.
Boot L.
Mud L.
Lund L.
Mud
Para...
Murra...
Hop...
Lon...
Fork
Cr.
Mud
Croix
St. Croix
C. & N.W.
W. Fk.
E. Fk.
53
AA
A
L
M
P
S
T
Y
G
13
18
24
25
30
31
36
1
6
7
12
19

Zimmerman Pine Moth - Dioryctria zimmermani (Grote)

Many of the current leaders and laterals of red pine were attacked in Waupaca County and parts of Waushara County in the East Central Area. Examination of the shoots indicated apparent failure of any of the larvae to complete their development.

Very little damage from this insect was reported in the West Central Area. Some attacks by the moth were noted on Scotch pine Christmas trees and around pruning wounds in older plantations.

The insects were active in windbreaks at the Boscobel Nursery (Grant County) and in nearby Christmas tree plantings in the Southern Area.

Phenological Notes:

May 29-30 - Severe frost occurred in Waupaca and Waushara County, and elsewhere in the state.

Jack Pine Shoot Borer - Eucosma sonomana Kearfott

More shoot borer damage was reported from Scotch pine Christmas trees in Juneau and Wood Counties in 1965 than in the previous two years. Damage was apparently very light elsewhere in the state.

Saddled Prominent - Heterocampa guttivitta (Walker)

An infestation on Chambers Island (Door County, Green Bay of Lake Michigan) which was under heavy attack by calosoma beetles when the island was visited on July 29, 1964, had dwindled to the point where only a few scattered larvae could be found with diligent searching and no defoliation was apparent on August 5, 1965. Control of the saddled prominent was attributed mainly to Calosoma scrutator Fabricius and Calosoma frigidum Kirby. Some credit for the decline may also be due to an unidentified disease which quickly destroyed about 200 larvae shortly after their transfer from the field to the laboratory.

Eastern Tent Caterpillar - Malacosoma americanum (Fabricius)

Infestations were heaviest in southern counties, particularly Grant and Rock, and diminished noticeably northward from Columbia and Sauk Counties.

Phenological Notes*:

May 20 - Larvae were predominantly in the 2nd and 3rd instars in Polk County.

May 25 - A few larvae were full-grown in Grant and Rock Counties.

May 27 - Larvae were in the 3rd and 4th instars in Polk County.

June 1 - Most larvae were full-grown and starting to migrate in Rock County.

June 15 - Most larvae pupated in Rock County.

July 2 - Moth emergence noted in southern counties.

July 15 - Egg masses observed on cherry in Columbia County. Evidence of defoliation no longer apparent.

* Notes for southern counties from Wisconsin Insect Survey Bulletin, Vol. 10, published by the Wisconsin Department of Agriculture, Plant Industry Division.

Forest Tent Caterpillar - Malacosoma disstria (Hubner)

A near mature larva was observed in Antigo (Langlade County) on aspen on June 10, and a last instar larva observed in Menominee County on June 16.

Egg mass surveys in northern aspen stands during November and December failed to reveal any evidence of burgeoning infestations.

ORTHOPTERA

Post Oak Locust - Dendrotettix quercus (Packard)

Principal centers of infestation in the Northeast Area were in the Towns of Beaver and Stephenson in Marinette County. Grasshopper populations were high throughout the general area infested with walking sticks, and early counts indicated severe defoliation might be expected. However, by mid-July a disease began having a telling effect on the maturing insects, and during mid-August mummified remains of the grasshoppers could be found everywhere on the vegetation in the infested areas. The severe defoliation expected from the grasshoppers did not materialize.

The grasshoppers were more numerous in the West Central Area than in 1964. High populations of newly hatched nymphs dwindled as the season progressed. Small areas of severe defoliation were noted in Adams, Jackson, Juneau, Monroe, and Wood Counties. Light defoliation was common in additional oak stands in these and other counties including Buffalo, Clark, Eau Claire, and LaCrosse.

Phenological Notes:

June 2 - Eclosion starting in Marinette County.

June 30 - Grasshoppers in the 3rd nymphal stage.

August 11 - Dead grasshoppers numerous on vegetation in Jackson County near Millston. Mating pairs numerous.

August 16 - Dead grasshoppers numerous on vegetation, and mating pairs common.

August 19 - Oviposition occurring.

Walkingstick - Diapheromera femorata (Say)

Since the peak odd-year defoliation in 1961 when 36,000 acres of predominantly oak timber were partially to completely defoliated in the Towns of Beaver and Stephenson in Marinette County (Northeast Area), acreage defoliated in odd years has been steadily shrinking. Although walkingstick adults were found throughout the towns mentioned, they were not present in sufficient numbers to cause apparent defoliation except on about 520 acres. This rapid decline can be attributed only to natural mortality factors of which little is known.

Collections of eggs in traps during the season indicated the overall population was still declining.

Male walkingsticks outnumbered females on most plots by the end of August. Exceptions were noted in pockets of severe defoliation where females were slightly more numerous.

Severe defoliation was confined to small pockets of oak scattered among jack pine stands in southeastern Menominee County, where the defoliated acreage dropped from 1,200 in 1963 to less than 400 acres in 1965.

Walkingsticks were more numerous in the Eau Claire County Forest in the West Central Area than they have been during the previous two years. Defoliation was minor except on a few acres near the center of the infested area where approximately 50% of the available oak foliage was consumed.

A few walkingsticks were observed at various locations in Buffalo, Jackson, and Vernon Counties, also in the West Central Area, but no defoliation was apparent.

Phenological Notes:

June 9 - Walkingsticks were in the first nymphal stage in Marinette County, many of them newly hatched. Apparently the peak of eclosion had not been reached.

June 18 - Nymphs were in the first and second instars in Marinette County.

July 20 - Most nymphs were in the third instar, and some fourth instars were observed in Marinette County.

August 6 - Most walkingsticks were in the adult stage and mating pairs were observed in Marinette County.

PESTICIDE RESIDUES

Thirteen deer fat samples collected in November, 1964 in the vicinity of timber which was treated on May 28 and 29 of that year contained DDT residues ranging from 0.230 ppm to 10.000 ppm. Five of these deer had residues in the fat exceeding 7.000 ppm. the level tolerated in the fat of beef.

Of twenty-one samples taken by the Food and Drug Administration from the same area about 18 months after the last application of DDT, 8 deer fat samples showed no detectable residue, six had residues ranging from 0.34 to 0.935 ppm, five had residues ranging from 1.083 to 1.930 ppm, and two had residues of 2.053 and 2.555 ppm.

All samples were analyzed by the Wisconsin Department of Agriculture by gas-liquid chromatography.

MAJOR FOREST DISEASES

WILTS AND DIEBACKS

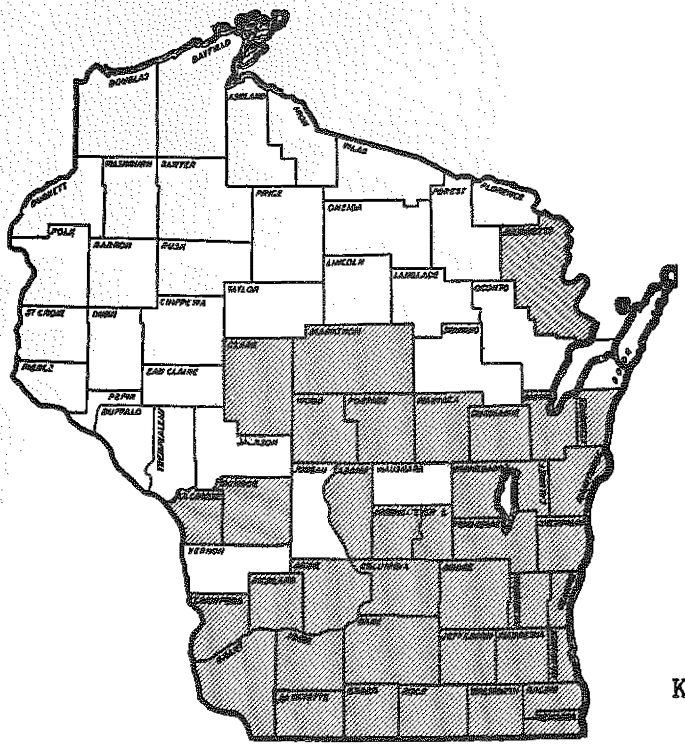
Oak Wilt - Ceratocystis fagacearum (Bretz) Hunt

Oak wilt was observed and confirmed in Chippewa and Dunn Counties. Local reports indicate the disease has been present since the 1950's but the official Forest Experiment Station Records did not have these counties listed. The disease is now present in 46 of Wisconsin's 72 counties (see map on page 26).

Dutch elm disease - Ceratocystis ulmi (Buisman) Moreau

Dutch elm disease has been reported in 39 of Wisconsin's 72 counties (see map below). In 1965 the Wisconsin Department of Agriculture's Plant Industry Laboratory processed 9,180 elm specimens and 7,934 were positively infected with Dutch elm disease. In Wisconsin the State Department of Agriculture administers the Dutch elm disease control program and details concerning status of control programs may be found in their "1965 Dutch Elm Disease Report".

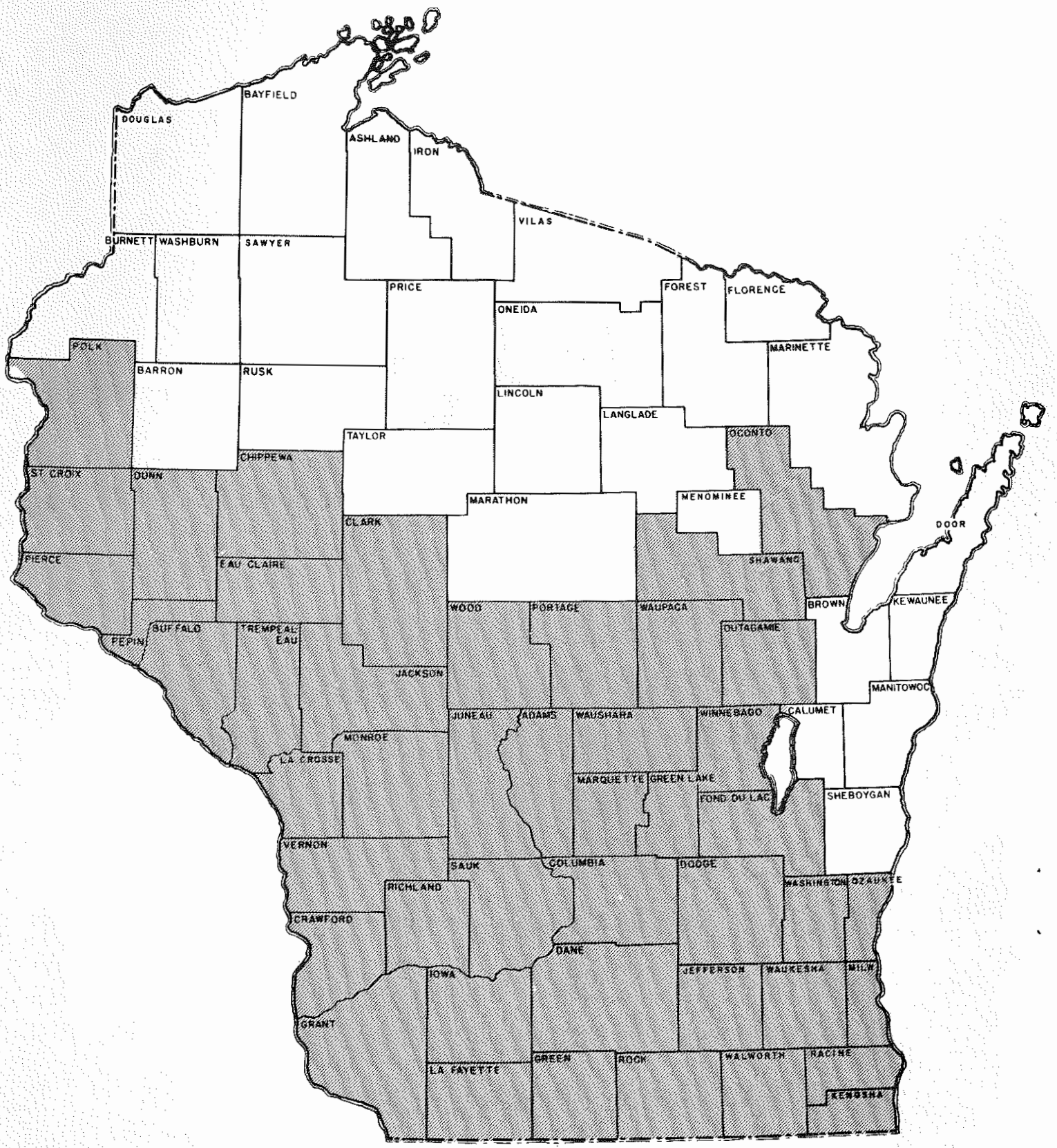
WISCONSIN



Known Distribution of Dutch Elm Disease 1965

Maple Dieback

Numerous requests were received concerning deteriorating maples along roadsides and within municipalities. Verticillium sp. was isolated from some of the trees, but the problem appears to be physiological and may be incited by such things as a drought or highway salt. This is not a forest problem.



Known Distribution of
Oak Wilt
1965

ROOT AND BUTT ROTS

Annosus Root Rot - Fomes annosus (Fr.) Cke.

To date Fomes annosus root rot has not been found in Wisconsin. One means of detecting the fungus is by trapping spores in the air and culturing the fungus on discs cut from young pine trunks which act as a selective medium for the fungus. In 1963, pine discs were exposed weekly in each of the five survey areas from May - June and September - October for periods of 8-24 hours. Similar exposures were made in the spring and fall of 1964.

In 1965 sampling continued, approximately 10 grams of pine foliage was collected weekly in each of the five survey areas from May-June and September - November. The foliage samples were sent to the Nevin Laboratory, washed in 100 ml of sterile distilled water and 2 ml of the needle washings pipetted on freshly cut red and white pine discs. The discs were incubated at room temperature for three weeks and were examined with a binocular microscope.

A cooperative survey for Fomes annosus was made in Minnesota on the Superior National Forest. Spore traps made from 6 inch square gauze bandages were exposed weekly from October 11 - January 3 on the Isabella, Tofte, Two Harbors, Virginia Ranger Districts and at the Eveleth Nursery. The gauze bandages were placed in polythylene bags, sent to the Nevin Laboratory, washed and incubated the same as the foliage samples. Cheesecloth spore traps were exposed at Madison, Wisconsin at the same time the gauze bandages were being exposed in Minnesota.

Fomes annosus was not found on either the Minnesota or Wisconsin samples. There were fewer fungal colonies and fewer species of fungi present on the Minnesota samples. This may have resulted because the Minnesota samples were mailed to Madison and many of the fungal spores may have been inactivated or killed in transit.

There was some concern that the spore sampling technique was not adequate in detecting Fomes annosus spores. Therefore, on September 2, three samples of shortleaf pine were collected from known annosus root rot areas in the Shawnee National Forest in Illinois, sent to Nevin and processed. Fomes annosus was found on one of the samples.

Polyporus tomentosus Root Rot - Polyporus tomentosus Fr.

The following report by R. F. Patton of the University of Wisconsin summarizes the status of Polyporus tomentosus root rot in Wisconsin.

"Polyporus tomentosus Fr., a root rot of conifers, appears to have considerable potential for causing disease losses in the pine plantations of Wisconsin. The extent to which it is present in the State is not known. However, it was found in 1965 on red pine stumps in a recently thinned area of the Crandall plantation at Wisconsin Dells, was found on declining jack pine at Lone Rock and Wisconsin Rapids in 1963 and 1964, and has become well

established in a white spruce plantation near Keshena. The possibility of this pathogen developing into a major stump invader as our pine plantations are thinned is very real indeed. The fungus could then move from the roots of the stump into the roots of adjacent trees, causing the circular patch of dead and dying trees similar to that associated with the notorious Fomes annosus Karst. Current knowledge concerning the biology of Polyporus tomentosus is very meager. Our major effort is being directed toward finding out how the fungus grows and persists in an area, the mode of infection, and its manner and rate of spread".

The plantations are located as follows:

Wisconsin Dells (Crandall Plantation)	- SW 1/4, Section 21, T14N, R6E
Lone Rock	- SE, SW, Section 6, T9N, R3E
Wisconsin Rapids Area	- SW, SE, Section 30, T22N, R6E NE, NE, Section 8, T20N, R6E SE, SE, Section 20, T19N, R6E
Keshena	NE, SE, Section 21, T28N, R15E

STEM AND BRANCH DISEASES

Eastern Gall Rust - Cronartium quercuum (Berk.) Miyabe ex Shirai
Western Gall Rust - Cronartium coleosporioides Arth. (Peridermium harknessii J. P. Moore)

A jack pine gall rust survey was made in Minnesota, Michigan and Wisconsin in 1963 and 1964 by the Lake States Forest Experiment Station. A total of 1,357 aeciospore collections were made for the purpose of differentiating eastern gall rust, Cronartium quercuum from western gall rust C. coleosporioides. In Wisconsin 251 collections were made and two of these were western gall rust. Details of the survey may be found in Anderson 1965. The distribution of eastern and western gall rusts in the Lake States Plant Disease Reporter 49:527-528.

A survey to determine the importance of western gall rust in Wisconsin was made by W. T. McGrath at the University of Wisconsin in 1965. Aeciospores were collected from galled jack pine in eight Wisconsin counties. Germ tube development and oak inoculations resulted in only eastern gall rust being detected.

The eight counties where collections were made in 1965 were: Adams, Bayfield, Douglas, Eau Claire, Iowa, Iron, Vilas and Wood.

Scleroderris canker - Scleroderris lagerbergii (perfect stage)
Brunchorstia pinea (imperfect stage)

A dieback disease of red and jack pine formerly known as Jone's disease was found to be caused by the fungus Scleroderris lagerbergii by plant pathologists at the Lake States Forest Experiment Station. In 1964 surveys were made by National Forest personnel in the Hiawatha and Ottawa

National Forests in the Upper Peninsula of Michigan and Chequamegon and Nicolet National Forests in northern Wisconsin. In Wisconsin, a survey of 51 plantations (2-10 year old red and jack pine) on the Chequamegon National Forest revealed 69 percent of the plantations were infected. A similar survey 52 plantations in the Nicolet National Forest revealed that 63 percent of the plantations were infected.

Little is known about the disease cycle Scleroderris canker and the impact it has on young red and jack pine plantations in Wisconsin. Thus, surveys for the disease are planned on state and county forest land in 1966.

OTHER PROBLEMS

Winter Injury

Approximately 80 acres of 10-20 year old red and jack pine were winter injured in Section 20, T20N, R4E of Juneau County. Symptoms varied from one to two flagging branches per tree to a complete redding of the upper crown. Associated with the flagging branches was blue stained wood and inner bark tissue.

8-66
mjf